



# **KB-400**

## **Keyboard Mixer/Power Amp**

### **Operators Manual**



**WARNING**  
TO PREVENT ELECTRICAL SHOCK OR FIRE HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.  
BEFORE USING THIS APPLIANCE READ BACK COVER FOR FURTHER WARNINGS.

#### **FRONT PANEL**

##### **High Gain Input (A)**

Provided for instruments that have low gain (ie: Rhodes Piano). It is (+ 10 dB) louder than the Low Gain input.

##### **Low Gain Input (B)**

Provided for instruments that have high output levels which can result in overdriving (distorting) the High Gain Input.

##### **Pre EQ Patch Jacks (C)**

Send and Return jacks are provided for in line patching of low level (instrument signal) type effects devices before (PRE) the E.Q. circuit. Note: Line level (1 volt) devices should be patched at the master patch panel. To patch an effects unit, connect the send jack to the input of the device. Next, connect the output of the device to the return jack. (High quality shielded cables must be used for these connections).

##### **Level (D)**

Controls the input volume level of the channel.

##### **Low EQ (E)**

An active tone control (shelving type, +/- 15 dB) that varies the low frequency range.

Caution: excessive low frequency boost causes greater power consumption and increases possibility of speaker damage.

##### **Low Mid EQ (F)**

An active tone control (peak/notch, +/- 15 dB) that varies the low mid frequency range.

##### **High Mid EQ (G)**

An active tone control (peak/notch, +/- 15 dB) that varies the high mid frequency range.

##### **High EQ Control (H)**

An active tone control (shelving type, +/- 15 dB) that varies the high frequency range.

##### **Effects (A) (send) (I)**

Adjust signal level applied to effects A send jack. Effects unit must be patched into effects A send/return jacks. Master Effects A return control blends external effect with main signal.

#### **Effects B/Reverb (send) (J)**

Adjust signal level applied to effects (B) send jack and internal reverb system. Accommodates reverb and external effects, device simultaneously. Effects unit must be patched into effects B send/return jacks. Master effects B return control blends external effect with main signal. Reverb return blends internal reverberation with main signal.

#### **DDT™ Compressor LED (K)**

DDT™ (Distortion Detection Technique) U.S. Patent #4318053. Prevents the power amplifier from severe clipping (distorting). L.E.D. illuminates when compressor turns on.

#### **Power LED (L)**

Illuminates when AC power is being supplied to the amp.

#### **Graphic Equalizer (M)**

9 band active type (+/-12 dB boost/cut per band). Use for tone coloration, room equalization, etc.

The action of a graphic equalizer is generally well understood but several precautions should be taken to avoid overboosting the frequency extremes and thus creating difficulties. The graphic equalizer **follows** the channel equalization which is substantial by itself and when combined with the boost capability of the graphic, the range becomes tremendous. When running the individual channel equalization near full clockwise positions, one should generally avoid overboosting that particular range again in the graphic. This "double EQ" capability enables a fantastic amount of cut or boost but must be used wisely to avoid creating a "boomy" or "muffled" sound when too much low end is boosted, as well as creating "strident", "screechy" or noisy operation when too much high end is boosted. One should also be aware that the "double equalization" also may cause problems in the extreme cut positions since cutting the EQ is the equivalent of reducing the gain for the affected frequency range. Experimentation will quickly illustrate the effectiveness of these equalization controls and generally, no difficulty whatsoever should be encountered.

#### **Effects A Return (N)**

Master effects level (return) control for effects unit patched into effects (A) send/return jacks: This control only operative when effects unit is patched into master effects (A) send/return jacks.

#### **Effects B Return (O)**

Master effects level (return) control for effects unit patched into effects (B) send/return jacks. This control only operative when effects unit is patched into master effects (B) send/return jacks.

#### **MASTER LEVEL CONTROL (P)**

The master level control adjusts the gain of the main mixing buss and determines the level at the main output jack, as well as determining the signal level applied to the input of the graphic equalizer/power amplifier. It is generally good practice to operate the master level control somewhere in the middle of its operating range to allow maximum flexibility in adjusting overall levels, i.e., it's poor practice to run the individual channel gains way up and the master control way down since this effectively negates flexibility afforded by the master control.

#### **MASTER REVERB RETURN CONTROL (Q)**

The master reverb control determines the amount of delayed signal (reverberation) that is mixed back into the main mix buss. The action of this control is defeated by use of a remote switch being plugged into the footswitch jack located on the patch panel. It is important to note that no reverberation will occur unless the internal delay line is being fed signal from the channel (B) effects send controls.

#### **CROSSOVER (R)**

The KB-400 is equipped with a built-in variable crossover network (150 Hz to 1.5 KHz which gives the keyboardist the basic tools to perform the bi-amp function. To obtain the bi-amp function, the musician must acquire one (1) additional power amp and one (1) additional loudspeaker and enclosure. Use a short high quality **shielded** patch cord and make the connection **from** the high output of the crossover section to the **power amp input** of the KB-400. Use a longer high quality **shielded** patch cord to make the connection **from** the **low** output of the crossover section to the external power amps input.

There are many bi-ampable Peavey speaker systems that will provide excellent performance with the KB-400. These are the 112, 115 and 118 Internationals, SP-1, SP-2, Project V and the 1545 Slant Monitor.

#### **EFFECTS A AND B SEND/RETURN JACKS (S)**

Use for patching external effects devices capable of receiving 1 volt input and delivering 1 volt output. To patch an effects unit, connect the send jack to the input of the device. Next, connect the output of the device to the return jack. (High quality shielded cables must be used for these connections).

#### **MAIN OUT (T)**

High level post channel EQ/pre master EQ signal send. The output level is determined by the gain and equalization settings as well as the master level control.

#### **EQ INPUT (U)**

The graphic input jack provides means to allow patching into the internal graphic equalizer/power amp. The jack is of the switching type that normally picks up the signal from the main output jack. When a plug is inserted into the graphic input, the circuit path is broken and this input may now be patched into other devices or any of the output jacks of the KB-400. The graphic input provides much greater flexibility by allowing the internal graphic/power amp to be utilized as a monitor amp or for any other purpose the user may deem necessary independent of the preamp section. Its input impedance is approximately 220K ohms and requires a 1 volt signal level for full output at the speaker jacks with the equalizer flat.

#### **EQ OUT (V)**

The graphic output provides access to the output of the graphic equalizer. In the normal operating mode, this signal is the same that is patched to the power amp and can be used to drive external accessories such as tape recorders and boost amplifiers. When a jack is plugged into the power amp input, the equalizer is disconnected from the internal power amp and, because we have provided patch points at the input **and** at the output of the graphic, the equalizer can be patched "in line" elsewhere in the KB-400 or in conjunction with external accessories thus providing total system flexibility.

#### **CROSSOVER INPUT (W)**

Input to active built in crossover. This jack is of the switching type that normally picks up the signal from EQ out jack. When a plug is inserted into the crossover input, the circuit patch is broken and the crossover can now be patched into any other output jacks of the KB-400.

#### **POWER AMP INPUT (X)**

The power amp input has been provided to allow the KB-400's internal power amplifier to be patched into any output of the KB-400 or to any signal source capable of delivering 1 volt RMS into 22K ohms. The power amp input is normally internally patched to the graphic output. When a jack is inserted into the power amp input, the internal patch is broken. This isolates the graphic equalizer and makes the power amp's input available to signals from other devices or any of the output jacks of the KB-400.

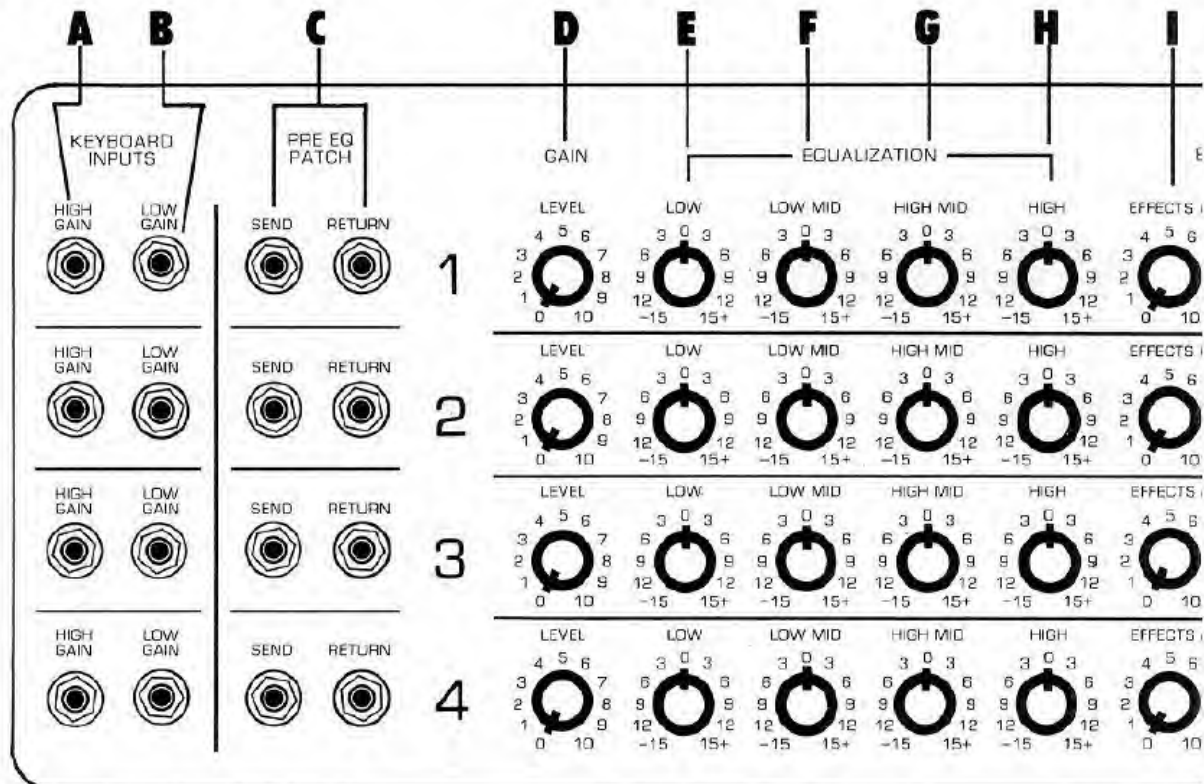
#### **REVERB FOOTSWITCH (Y)**

The footswitch jack accommodates the supplied remote reverb cutoff pedal. This footswitch jack is conventional and should present no operational problems.

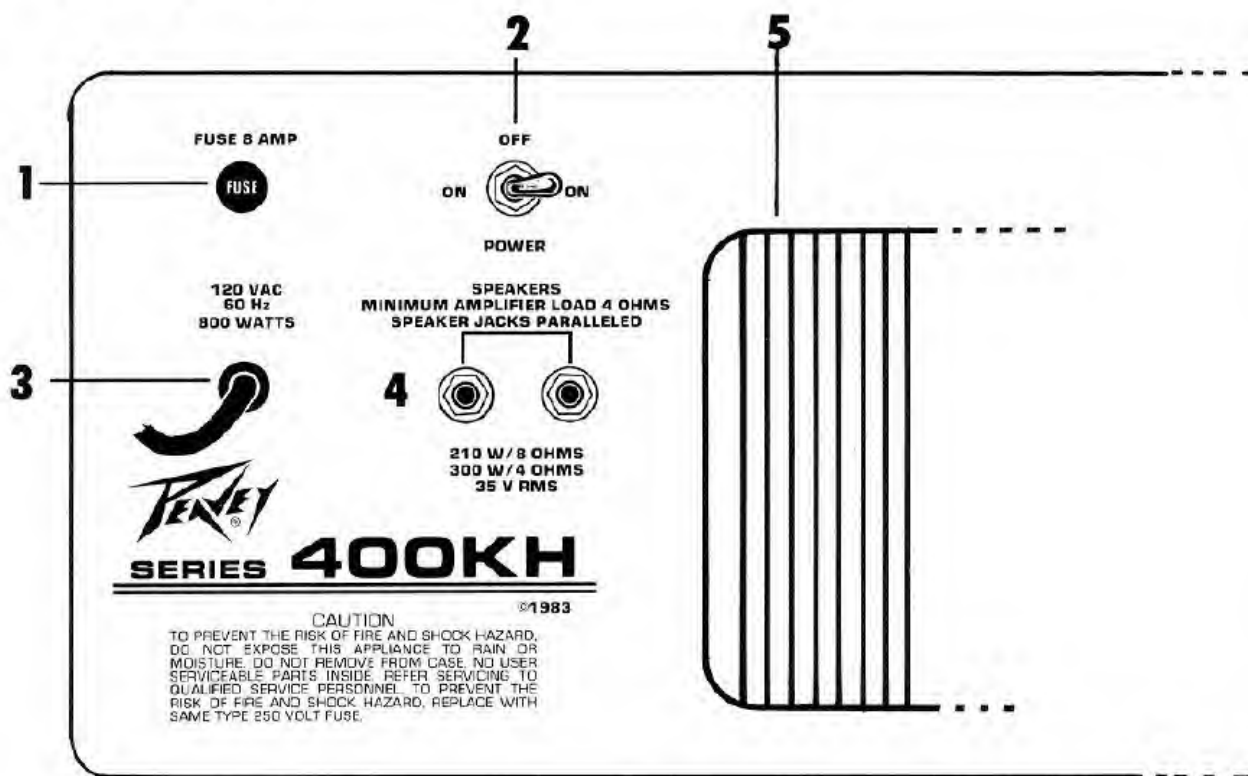
## HIGH/LOW CROSSOVER OUTPUT JACKS [Z]

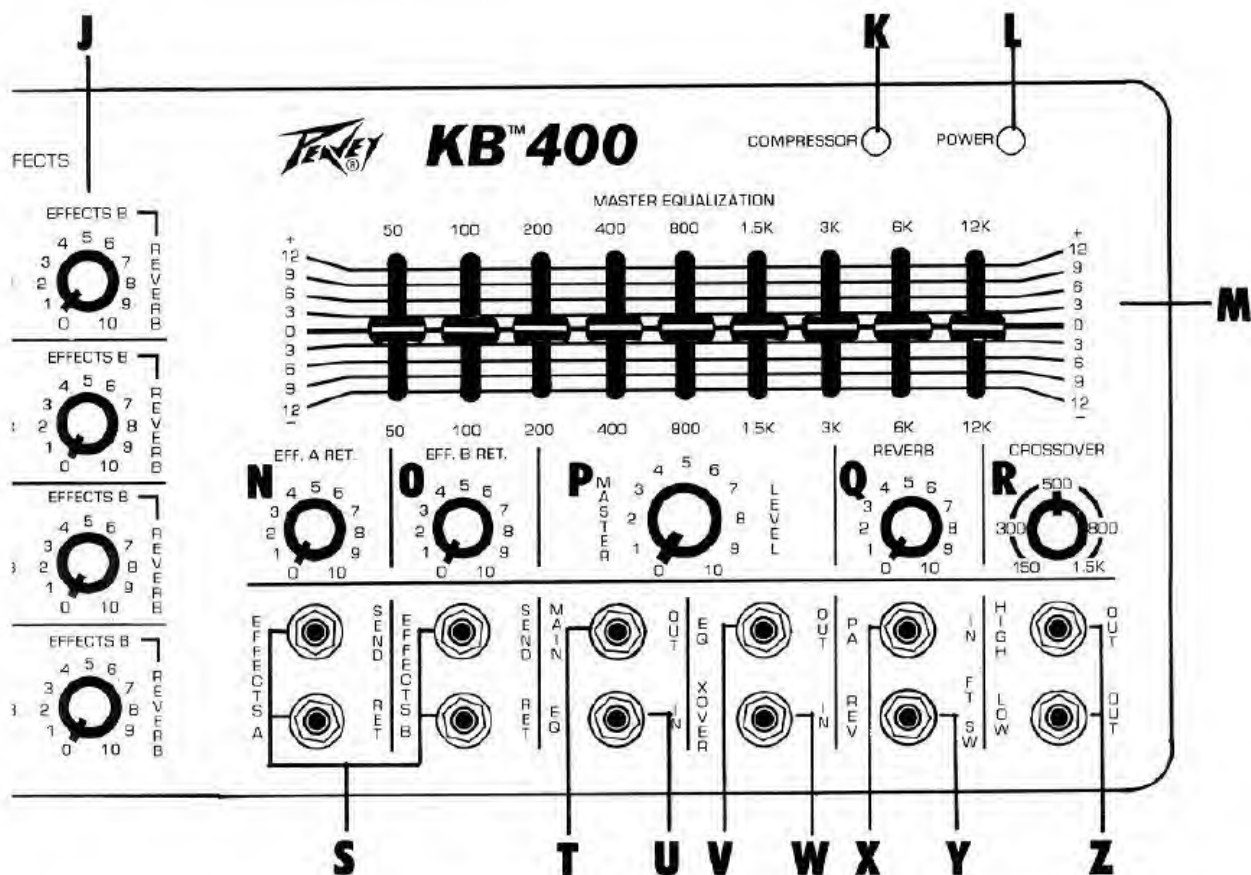
In order to use the internal crossover, signal must be patched from HI and LOW crossover output jacks to amplifier/ speaker systems designated for hi and low pass of bi-amped system. The internal power amplifier may be used for one half of the bi-amped system by patching either hi or low output into power amp input jack of the KB-400. Note: When internal amplifier of KB-400 is used, it is necessary to have only one additional power amplifier to complete the bi-amped process.

## Front Panel



## Rear Panel





#### REAR PANEL FUSE (1)

The fuse is located within the cap of the fuseholder. It is necessary that the fuse be replaced with the proper type and value fuse if it should fail in order to avoid damage to the equipment and to prevent voiding the warranty. If your unit repeatedly blows fuses, it should be taken to a qualified service center for repair.

#### POWER SWITCH (2)

On domestic units, the power switch is of the three-position type with the center position being "OFF." This switch has two "ON" positions, one of which is used to ground the amplifier properly. One of the "ON" positions will yield the lowest amount of residual hum or "popping" and this is the position that should be used.

On export models, we utilize a simple on/off switch that does not have multiple "ON" positions since the grounding (earthing) conditions in most countries are made positively through standard tamper-proof plug-in systems.

#### LINE CORD (3)

For your safety, we have incorporated a three-wire line (mains) cable with proper grounding facilities. It is not advisable to remove the ground pin under any circumstances. If it is necessary to use the amp in a two-pin plug system without proper grounding facilities, suitable grounding adaptors should be used. Much less noise and greatly reduced shock hazard exist when the unit is operated with the proper grounded receptacles.

#### SPEAKER OUTPUTS (4)

The speaker output jacks are of the standard  $\frac{1}{4}$ " type. Both the output jacks are wired in parallel and either or both may be used when connecting your speaker system. The 400BH module is optimized for a minimum total load of 4 ohms. Load impedances lower than 4 ohms will overload the power amplifier and cause premature activation of the power amp's short circuit protection system and/or thermal fault protection circuitry. Because of the unique design of the compressor, the circuit will still minimize clipping regardless of load values.

#### LINE (MAINS) CORD RETAINER (5)

We have provided two large molded line cord retainers on the rear panel to allow storage of the mains cable for travel. In operation, the cable should be completely unwrapped to allow maximum heat dissipation from the rear panel/heatsink.



# KB-400 KEYBOARD MIXER/POWER AMP SPECIFICATIONS

## SUMMARY OF FUNCTIONS:

4 channels in, 1 main out, 2 effects loops plus internal reverb, 300 watt power amp with DDT II™, built in crossover for add/on bi-amp capability. Each channel: High and low gain keyboard inputs, pre EQ patch, gain control, 4 band EQ, effects A send control, effects B/reverb send control. Master section controls: Master level, 9 band graphic EQ, effects A return, effects B return reverb return, bi-amp crossover frequency. Master section Patch: effects (A) send and return, effects (B) send and return, main out, EQ in, EQ out, crossover in, power amp in, reverb foot switch, crossover high and low out.

## MIXER SECTION:

The following preamp specs are measured with all EQ controls set flat @ 0 dB, effects A & B send controls set @ 4, master level control set @ 5, and master reverb set @ 0; nominal signal levels are with channel level & eff. ret. controls set @ 5, minimum levels are with these controls set @ 10.

## KEYBOARD INPUTS: (HIGH GAIN)

Impedance: High Z, 220K ohms  
Nominal Input Level: -22 dBV, 80 mV RMS  
Minimum Input Level: -36 dBV, 15mV RMS  
Maximum Input Level: +12 dBV, 4 V RMS

## KEYBOARD INPUTS (LOW GAIN, -10 dB)

Impedance: High Z, 67K Ohms  
Nominal Input Level: -12 dBV, 250 mV RMS  
Minimum Input Level: -26 dBV, 50 mV RMS  
Maximum Input Level: +22 dBV, 12 V RMS

## PRE EQ PATCH SEND:

Function: Channel effects device send  
Load Impedance: 10K ohms or greater  
Nominal output: -14 dBV, 0.2 V RMS

## PRE EQ PATCH RETURN:

Function: Channel effects device return  
Impedance: High Z, 57K ohms  
Designed input level: -14 dBV, 0.2 V RMS  
(Switching jack providing patch send to patch return connection when not used)

## EFFECTS (A) & (B) SENDS:

Function: Master effects device sends  
Load Impedance: 1K ohms or greater  
Nominal output: -12 dBV, 250 mV RMS  
Maximum Output: +18 dBV, 8 V RMS

## EFFECTS (A) & (B) RETURNS:

Function: Master effects device returns  
Impedance: High Z, 100K ohms  
Nominal Input Level: -12 dBV, 250 mV RMS  
Minimum Input Level: -30 dBV, 30 mV RMS  
Maximum Input Level: +6 dBV, 2 V RMS

## MAIN OUTPUT: (MASTER MIX OUTPUT)

Function: High level post channel EQ/Pre master EQ signal send.  
Load Impedance: 1K ohms or greater  
Nominal Output: 0 dBV, 1V RMS  
Maximum Output: +18 dBV, 8V RMS

## EQ INPUT: (GRAPHIC EQUALIZER IN)

Function: High level post channel EQ/Pre Master EQ signal return  
Impedance: High Z, 220K ohms  
Designed Input Level: 0 dBV, 1 V RMS  
(switching jack providing main output to EQ input connection when not used)

## EQ OUTPUT: (GRAPHIC EQUALIZER OUT)

Function: High level post EQ signal send  
Load Impedance: 1K ohms or greater  
Nominal Output: 0 dBV, 1 V RMS  
Maximum Output: +18 dBV, 8 V RMS

## PA INPUT: (POWER AMPLIFIER IN)

Function: High level post EQ signal return  
Impedance: High Z, 22K ohms  
Designed Input Level: 0 dBV, 1 V RMS  
(Switching jack providing EQ output to PA input connection when not used)

## CROSSOVER INPUT: (VARIABLE CROSSOVER IN)

Function: High level post EQ signal return when bi-amp system is used  
Impedance: High Z 10K ohms  
Designed Input Level: 0 dBV, 1 V RMS  
(Switching Jack Providing EQ output to crossover input connection when not used)

## HIGH OUTPUT (VARIABLE CROSSOVER OUT)

Function: High level crossover high pass send  
Load impedance: 1K ohms or greater  
Nominal Output: 0 dBV, 1 V RMS  
Maximum Output: +18 dBV, 8 V RMS

## LOW OUTPUT: (VARIABLE CROSSOVER OUT)

Function: High level crossover low pass send  
Load Impedance: 1K ohms or greater  
Nominal output: 0 dBV, 1 V RMS  
Maximum Output: +18 dBV, 8 V RMS

## REVERB FOOTSWITCH:

Function: Reverb defeat

THE FOLLOWING SPECS MEASURED AT NOMINAL SETTINGS, ALL CHANNEL INPUTS TERMINATED WITH 47 K OHMS

## FREQUENCY RESPONSE:

(Channel In/EQ Out with 1V RMS Output)  
+0, -2 dB, 40 Hz to 20 KHz

## PREAMP HUM & NOISE:

(@ EQ Out Jack)  
-80 dBV (all 4 channels operational)

## SYSTEM DISTORTION:

(Channel In/EQ Out, 40 Hz - 20 KHz @ 1 V RMS)  
Less than .05% THD, typically below .02%

## EQUALIZATION: (EACH CHANNEL)

+15 dB @ 60 Hz & 10 KHz, shelving  
+15 dB @ 600 Hz & 2 KHz, Peak/Notch

## EQUALIZATION: (MASTER GRAPHIC)

+12 dB @ 50 Hz, 100 Hz, 200 Hz, 400 Hz, 800 Hz, 1.5 KHz, 3 KHz, 6 KHz, & 12 KHz

## CROSSOVER FREQUENCY RANGE:

150 Hz to 1.5 KHz @ 12 dB/Octave

## POWER AMPLIFIER SECTION:

Rated Power & Load:  
210 W RMS into 8 ohms  
300 W RMS into 4 ohms  
with DDT II compression and LED indicator

## POWER @ CLIPPING

(Typically @ 5% THD, 1 KHz, 120 VAC line)  
8 OHMS:

220 W RMS burst (keyboard attack)  
150 W RMS continuous (DDT II Limit)

4 OHMS:  
310 W RMS burst (keyboard attack)  
220 W RMS continuous (DDT II Limit)

2 OHMS:  
Not recommended (Current limit)

## DDT II DYNAMIC RANGE:

Greater than 18 dB

## DDT II MAXIMUM THD:

Less than 0.5% THD for 6 dB overload  
Less than 1% THD for 14 dB overload

## DDT II ATTACK:

5 Millesec @ 6 dB overload  
10 Millesec @ 14 dB overload

## DDT II HOLD TIME:

200 Millesec

## DDT II DECAY TIME:

1 Second

## FREQUENCY RESPONSE:

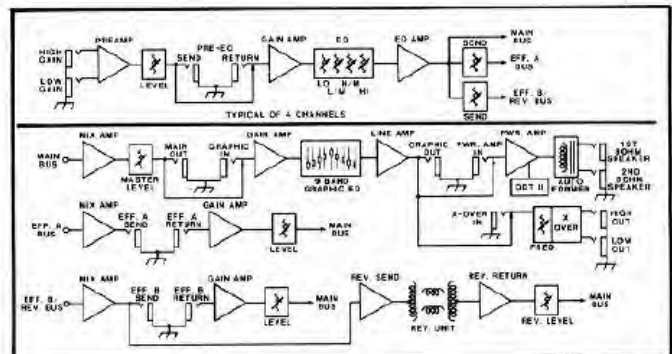
+0, -1 dB, 20 Hz to 20 KHz @ 200 W RMS into 4 ohms

## TOTAL HARMONIC DISTORTION:

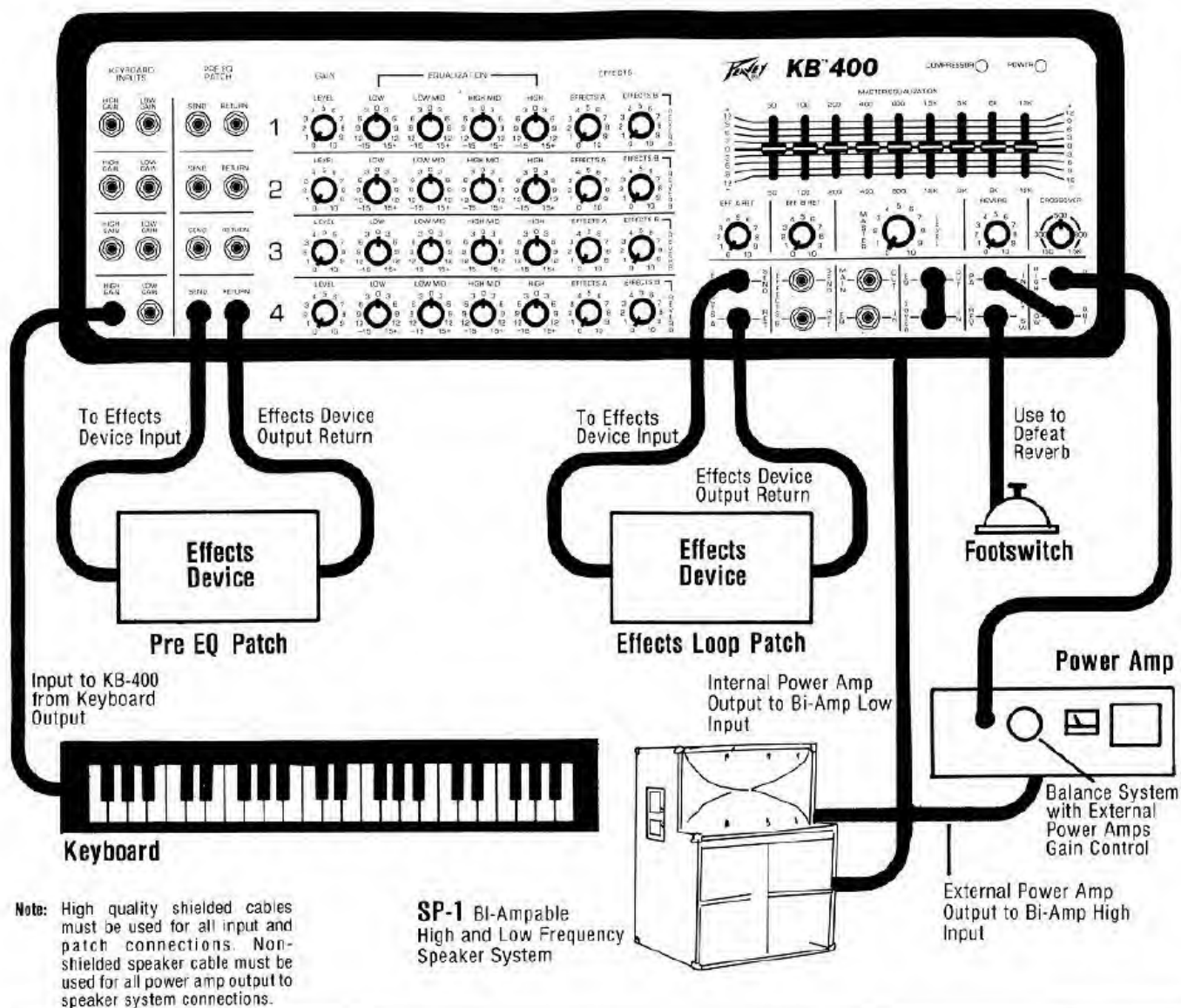
Less than 0.2%, 100 mW to 200 W RMS,  
20 Hz to 10 KHz, 4 ohms, typically below 0.1%

## POWER CONSUMPTION: (DOMESTIC)

800 watts, 50/60 Hz, 120 VAC



# EXAMPLE OF BI-AMP HOOKUP AND EFFECTS PATCHES



**WARNING**  
EXPOSURE TO EXTREMELY HIGH NOISE LEVELS MAY CAUSE A PERMANENT HEARING LOSS. INDIVIDUALS VARY CONSIDERABLY IN SUSCEPTIBILITY TO NOISE INDUCED HEARING LOSS, BUT HEARING LOSS MAY OCCUR IF EXPOSED TO SUFFICIENTLY INTENSE NOISE FOR A SUFFICIENT TIME.

THE U.S. GOVERNMENT'S OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) HAS SPECIFIED THE FOLLOWING PERMISSIBLE NOISE LEVEL EXPOSURES:

DURATION PER DAY IN HOURS	SOUND LEVEL dBA, SLOW RESPONSE
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
7/8	110
1/2	115

ACCORDING TO OSHA, ANY EXPOSURE IN EXCESS OF THE ABOVE PERMISSIBLE LIMITS COULD RESULT IN SOME HEARING LOSS. EAR PLUGS OR EARPLUGS IN THE EAR CANALS OR OVER THE EARS MUST BE WORN WHEN OPERATING THIS AMPLIFICATION SYSTEM IN ORDER TO PREVENT A PERMANENT HEARING LOSS IF EXPOSURE IS IN EXCESS OF THE LIMITS AND SET FORTH ABOVE. TO INSURE AGAINST POTENTIAL VIBRATION DUE TO EXPOSURE TO HIGH SOUND PRESSURE LEVELS, IT IS RECOMMENDED THAT ALL PERSONS EXPOSED TO EQUIPMENT CAPABLE OF PRODUCING HIGH SOUND PRESSURE LEVELS SUCH AS THIS AMPLIFICATION SYSTEM BE PROTECTED BY HEARING PROTECTORS WHILE THIS UNIT IS IN OPERATION.

**CAUTION**  
THIS MIXING CONSOLE/FRAME HAS BEEN DESIGNED AND CONSTRUCTED TO PROVIDE ADEQUATE SIGNAL VOLTAGE FOR PLAYING MODERN MUSIC. IMPROPER USE OF THE GAIN/EQUALIZATION CONTROLS AND/OR IMPROPER USE OF INTERNAL/EXTERNAL BUSES MAY CREATE CLIPPING (SQUARE WAVES) AND POSSIBLY CAUSE SUBSEQUENT DAMAGE TO THE LOUDED SYSTEM. EXTENDED OPERATION OF THE GAIN/EQUALIZATION CONTROLS IN THEIR MAXIMUM POSITIONS IS THEREFORE NOT RECOMMENDED. PLEASE BE AWARE THAT MAXIMUM POWER CAN BE OBTAINED AT VERY LOW SETTINGS OF THE GAIN/EQUALIZATION CONTROLS IF THE INPUT SIGNAL IS VERY STRONG.

IT IS COMMON PRACTICE AMONG PROPS OF SOUND REINFORCEMENT EQUIPMENT TO IDENTIFY THE INDIVIDUAL CHANNELS WITH A STRIP OF TAPE PLACED ABOVE OR BELOW THE ROW OF VOLUME POTENTIOMETERS. MANY TYPES OF TAPE HAVE A VIDEOTAPES REELS OR WHICH CAN BE USED TO IDENTIFY THE PAINT (ON THE FACE OF THE TAPE) AND LOGICALLY REMOVE THE TAPE WHEN THE TAPE IS REMOVED. WE STRONGLY RECOMMEND THAT SCOTCH TAPE NOT BE USED ON PAINTED SURFACES NOR ANY OTHER TAPE THAT IS NOT SPECIALLY DESIGNED FOR SUCH APPLICATIONS. MEDIUM OR LIGHT ADHESIVE MASKING OR MIXER LABEL TAPE IS RECOMMENDED IF TAPE IS USED. ANY TAPE LEFT ON PAINTED SURFACE FOR EXTENDED PERIODS WILL BE DIFFICULT TO REMOVE. NEVER USE CLEAR OR SCOTCH TAPE FOR THESE APPLICATIONS.

- Read all safety and operating instructions before using this product.
- All safety and operating instructions should be retained for future reference.
- Obey all cautions in the operating instructions and on the back of the unit.
- All operating instructions should be followed.
- This product should not be used near water, i.e. a bathtub, sink, swimming pool, wet basement, etc.
- This product should be located so that its position does not interfere with its proper ventilation. It should not be placed too close to a wall or placed in a built-in enclosure that will impede the flow of cooling air.
- This product should not be placed near a source of heat such as a stove, heater, radiator or another heat producing appliance.
- Connect only to a power supply of the type marked on the unit adjacent to the power supply cord.
- Never break off the ground pin on the power supply cord. For more information on grounding, write for our free booklet "Shock Hazards and Grounding".
- Power supply cords should always be handled carefully. Never walk or place equipment or power supply cords. Periodically check cords for cuts or signs of stress, especially at the plug and the ports where the cord enters the unit.
- The power supply cord should be unplugged when the unit is to be unused for long periods of time.
- Meta-zoids can be cleaned with a damp rag. The vinyl covering used on some units can be cleaned with this damp rag, or an ammonia based household cleaner if necessary.
- Care should be taken so that liquids do not fall into liquids are not spilled into the unit through the ventilation holes or any other openings.
- This unit should be checked by a qualified service technician if:
  - The power supply cord or plug has been damaged.
  - Anything has fallen or been spilled into the unit.
  - The unit does not operate correctly.
  - The unit has been dropped or the enclosure damaged.
- The user should not attempt to service this equipment. All service work should be done by a qualified service technician.

Due to our efforts for constant improvement, features and specifications are subject to change without notice.



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